

## REMARKS

Applicants respectfully request reconsideration of the subject matter identified in caption, pursuant to and consistent with 37 C.F.R. §1.116, and in light of the remarks which follow.

Claims 20-21, 23-26, and 31-39 are pending in the application.

Entry of this response is proper under 37 C.F.R. § 1.116 because the response places the application into condition for allowance (for the reasons discussed herein), or places the application into better form for appeal, should an appeal be necessary. The response does not present any additional claims and does not raise the issue of new matter since the response is directed to subject matter previously considered during prosecution. The remarks presented supplement those in Applicants' earlier responses and are presented here in further response to issues raised in the final rejection. Applicants respectfully request entry of the response.

Applicants thank the Examiner for withdrawing the objection to claims 23 and 27 and withdrawing the rejection of claims 20-21, 23-26 and 31-39 under 35 U.S.C. § 102(b) over Nakanishi (U.S. Patent No. 5,847,181) in view of Applicants' prior amendments and remarks. For at least the reasons that follow, Applicants respectfully submit that all pending claims in the application are in condition for allowance.

Turning now to the Official Action, claims 20-21, 23-26 and 31-39 continue to stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakanishi in view of Halm (U.S. Patent No. 5,059,343). For at least the reasons that follow, withdrawal of the rejection is in order.

Independent Claim 20 defines a process for the preparation of alkylhalosilanes which comprises reacting an alkyl halide with a solid body formed of silicon in the presence of a catalytic system comprising (α) a copper catalyst and (β) a group of promoting additives, wherein said group comprises:

an additive β1 chosen from metallic zinc, a zinc-based compound or a mixture thereof,

an additive β2 chosen from tin, a tin-based compound or a mixture thereof,

optionally, an additive β3 chosen from cesium, potassium, rubidium, a compound derived from these metals or a mixture thereof, wherein

the copper catalyst (α) is in the form of metallic copper, a copper halide or a mixture thereof, and

the solid body includes a supplementary promoting additive β4 wherein the additive β4 is an alkali metal hypophosphite, an alkaline earth metal hypophosphite, a metal hypophosphite or a mixture thereof. (Emphasis added.)

Nakanishi relates to an improvement in the direct process for preparing an alkylhalosilane and more particularly, to a process for continuously preparing an alkylhalosilane by gas-solid contact reaction between metallic silicon and alkyl halide in the presence of a copper catalyst. (See Nakanishi at column 1, lines 5-11.)

Halm deals with the use of certain non-volatile, phosphorous compounds in the production of silicone used in the direct process to produce alkylhalosilanes. (See Halm at column 1, lines 10-14.)

To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all of the claimed features. (See,

*In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974).) In addition, "all words in a claim must be considered in judging the patentability of that claim against the prior art." (See, *In re Wilson*, 424 F.2d 1382, 1385; 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970).) (See, also M.P.E.P. § 2143.03).

As explained in Applicants' Amendment of May 12, 2008, Applicants maintain that Nakanishi fails to disclose or fairly suggest certain features of independent Claim 20. In particular, Applicants continue to submit that Nakanishi fails to disclose or fairly suggest a supplementary promoting additive  $\beta 4$  wherein the additive  $\beta 4$  is an alkali metal hypophosphite, an alkaline earth metal hypophosphite, a metal hypophosphite or a mixture thereof. Furthermore, Applicants continue to submit that the secondary reference Halm fails to overcome this deficiency. Specifically, Halm fails to disclose or suggest modifying the process of Nakanishi to include a supplementary promoting additive  $\beta 4$  which is an alkali metal hypophosphite, an alkaline earth metal hypophosphite, a metal hypophosphite or a mixture thereof, as defined in independent claim 20.

In the absence of such disclosure in the asserted combination of references, Applicants respectfully submit that the Official Action has still not established a *prima facie* case of obviousness over the asserted combination of references because the references fail to disclose or fairly suggest each feature in the combination of features defined in independent claim 20. Applicants also continue to submit that the asserted combination of references does not provide a proper consideration of "all words" in claim 20 in judging the patentability of that claim against the asserted prior art. Again, the asserted combination does not reflect proper consideration of the words "a supplementary promoting additive  $\beta 4$  wherein the additive  $\beta 4$  is an alkali

metal hypophosphite, an alkaline earth metal hypophosphite, a metal hypophosphite or a mixture thereof." Applicants respectfully request that the Examiner further consider these points in view of Applicants' remarks and the supporting test results presented below.

Applicants submit that the Official Action does not establish a *prima facie* case of obviousness under § 103 because the Official Action also fails to provide sufficient reasons to demonstrate *why* one of ordinary skill in the art would have been led to modify Nakanishi to arrive at the claimed process including the particular recited combination of features (including the use of supplementary promoting additive  $\beta 4$  in the form of an alkali metal hypophosphite, an alkaline earth metal hypophosphite, a metal hypophosphite or a mixture thereof). The requisite motivation for doing so must stem from some teaching, suggestion or inference in the prior art as a whole or from the knowledge generally known to one of ordinary skill in the art, not from Applicants' disclosure. (See, *Ex Parte Nesbitt*, 25 U.S.P.Q. 2d 1817, 1819 (B.P.A.I. 1992); and *In re Oetiker*, 24 U.S.P.Q. 2d 1443, 1446 (Fed. Cir. 1992).) The mere fact that the prior art can be modified does not make such a modification obvious unless the prior art or some other evidence specifically suggests the desirability of the modification. (See, *In re Gordon*, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984).) There must be some intrinsic basis in the prior art or some extrinsic factor that would prompt one of ordinary skill in the art to modify the teachings of Nakanishi; otherwise, the Patent Office's burden of establishing a *prima facie* case of obviousness has not been met.

Moreover, the determination of whether some reason, suggestion or other basis existed for making the modification must be made from the viewpoint of a

hypothetical person of ordinary skill in the field. (See *In re Oetiker*, 24 U.S.P.Q. 2d 1446; and *In re Raines*, 28 U.S.P.Q. 2d 1630, 1631 (Fed. Cir. 1993).) In the present case, no such factors or motivation for modifying Nakanishi exists. As far as Applicants can tell, the Official Action's sole basis for supporting the position that it would have been obvious for one of ordinary skill in the art to make specific modifications to the process of Nakanishi are broad, general statements in the prior art that are completely silent about the particular combination of features recited in independent claim 20 and the resulting process's ability to significantly affect dimethyldichlorosilane selectivity and decrease formation of heavy products.

In view of the deficiencies in the prior art and the absence of any other evidence in the Official Action to suggest that one should, or even could, modify Nakanishi to arrive at the claimed process, Applicants submit that the Official Action has not demonstrated that one of ordinary skill in the art would have been motivated to modify Nakanishi to arrive the claimed process, including the specified combination of features. Accordingly, Applicants submit that there is no basis, absent the impermissible use of hindsight based on Applicants' disclosure, for modifying Nakanishi as suggested by the Official Action.

The Official Action also fails to establish that Nakanishi and Halm provide a reasonable expectation of success. See M.P.E.P. § 2143.02, which states that a reasonable expectation of success is required to establish a *prima facie* case of obviousness. That is, beyond looking to the prior art to determine if it suggests doing what the inventors have done, one must also consider if the prior art provides the required expectation of succeeding in that endeavor. (See *In re Dow Chem. Co. vs. American Cyanamid*, 837 F.2d at 473, 5 U.S.P.Q.2d at 1531 (both the suggestion

and the expectation of success must be found in the prior art, not in Applicant's disclosure). In this case, however, Applicants do not believe that the asserted combination of references provides either a suggestion or an expectation of success in doing with the inventors have done (i.e., combining the claimed features to arrive at a process for the preparation of alkylhalosilanes which significantly affects dimethyldichlorosilane selectivity and the quantity of formed heavy products). Specifically, there is no evidence in either of the cited references, alone or in combination, or in any other reference or evidence identified in the Official Action to demonstrate that one would have expected to the claimed process and its advantageous properties by modifying Nakanishi in view of Halm based on the disclosure of either reference by itself or combination with any other evidence.

In further support of Applicants' position concerning the claimed process, Applicants urge the Examiner to consider the following test results. In particular, in Table 1 presented below, Applicants have provided the results of tests of adding different phosphorus compounds to a contact mass including silicon, copper chloride ( $\text{CuCl}$ ), zinc chloride ( $\text{ZnCl}_2$ ) and tin (Sn introduced as bronze). In Table 1, Example 2 is presented as comparative test F. In Comparative test B, the phosphorous compound is a metal phosphide. In Comparative test F the phosphorous compound is a phosphate. The comparative tests show an improvement in dimethyldichlorosilane selectivity (i.e., the  $\text{CH}_3\text{SiCl}_3/(\text{CH}_3)_2\text{SiCl}_2$  ratio decreases) and a decrease in the quantity of formed heavy products. More importantly, however, the results show that if phosphorous is added in the form of hypophosphite, the improvement with regard to the best comparative is significant: -22% for the  $\text{CH}_3\text{SiCl}_3/(\text{CH}_3)_2\text{SiCl}_2$  ratio and -46% for the quantity of formed heavy products.

**Table 1**

	<b>Comparative test A</b>	<b>Comparative test B</b>	<b>Example 2 now Comparative test F</b>	<b>Example 1</b>	
<b>Copper Catalyst</b>	CuCl	CuCl	CuCl.Ca <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>	CuCl	
<b>Zn compound</b>	ZnCl <sub>2</sub>	ZnCl <sub>2</sub>	ZnCl <sub>2</sub>	ZnCl <sub>2</sub>	
<b>Sn compound</b>	Sn	Sn	Sn	Sn	
<b>phosphorous compound</b>	<b>none</b>	<b>Cu<sub>3</sub>P</b>	<b>CuCl.Ca<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub></b>	<b>Ca(H<sub>2</sub>PO<sub>2</sub>)<sub>2</sub></b>	
<b>phosphorous content (ppm)</b>		1000	1000	1000	Improvement with regard to best comparative
<b>CH<sub>3</sub>SiCl<sub>3</sub>/(CH<sub>3</sub>)<sub>2</sub>SiCl<sub>2</sub></b>	0,129	0,123	0,089	<b>0,069</b>	<b>-22%</b>
<b>Heavy Products (weight %)</b>	5,2	3,6	2,8	<b>1,5</b>	<b>-46%</b>

Applicants respectfully submit that the same improvement is observed when tests of adding different phosphorous compounds are made to contact a mass including silicon, metal copper (Cu°), zinc chloride (ZnCl<sub>2</sub>) and tin (Sn introduced as bronze). For the Examiner's convenience, Applicants present these results in Table 2 below.

**Table 2**

	<b>Comparative test D</b>	<b>Comparative test D</b>	<b>Example 1</b>	
<b>Copper Catalyst</b>	Cu°	Cu°	Cu°	
<b>Zn compound</b>	ZnCl <sub>2</sub>	ZnCl <sub>2</sub>	ZnCl <sub>2</sub>	
<b>Sn compound</b>	Sn	Sn	Sn	
<b>phosphorous compound</b>	<b>none</b>	<b>Cu<sub>3</sub>P</b>	<b>Ca(H<sub>2</sub>PO<sub>2</sub>)<sub>2</sub></b>	
<b>phosphorous content (ppm)</b>		1000	1000	Improvement with regard to best comparative
<b>CH<sub>3</sub>SiCl<sub>3</sub>/(CH<sub>3</sub>)<sub>2</sub>SiCl<sub>2</sub></b>	0,168	0,116	<b>0,091</b>	<b>-22%</b>
<b>Heavy Products (weight %)</b>	8	4,3	<b>1,7</b>	<b>-60%</b>

Applicants submit that these results provide further evidence that it would not have been obvious to one of ordinary skill in the art to modify Nakanishi to arrive at a process that includes the claimed combination of features (including supplementary promoting additive  $\beta 4$ ) to provide the various enhanced effects demonstrated by the above test results (i.e., improved dimethyldichlorosilane selectivity and decreased quantity of formed heavy products). More particularly, Applicants submit that it is surprising that they have been able to obtain these results by combining the particular elements recited in claim 20. Of course, neither of the cited references or any other evidence identified in the Official Action discloses or fairly suggests making the particular combination of features claimed to achieve these results.

Applicants submit that the above results are secondary considerations that must be considered. Indeed, the Federal Circuit has determined that evidence of secondary considerations can be the most probative and cogent evidence in the record. It can establish that an invention appearing to have been obvious in view of the prior art was not. (See Stratoflax Inc. v. Aeroquip Corp., 218 U.S.P.Q. 871, 879 (Fed. Cir. 1983); and Joy Technologies v. Manbeck, 17 U.S.P.Q.2d. 1257 (D.D.C. 1990).) In the instant Official Action, there is no appreciation in either of the references, alone or in combination, with any other evidence identified in the Official Action of the unexpected and surprising results obtained by the claimed combination of features. Accordingly, even if the Official Action had established a *prima facie* showing of obviousness, which Applicants submit that it has not, the unexpected results achieved by the claimed combination of features would rebut such a showing.

For at least these reasons, claim 20 is patentable over the combination of Nakanishi in view of Halm. The remaining claims depend, directly or indirectly, from



claim 20 and, therefore, are also patentable over the asserted combination of references for at the least reasons that claim 20 is patentable. Reconsideration and withdrawal of the rejection are respectfully requested.

From the foregoing, Applicants earnestly solicit further and favorable action in the form of a Notice of Allowance.

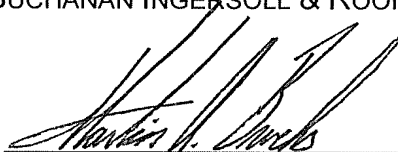
If there are any questions concerning this paper or the application in general, Applicants invite the Examiner to telephone the undersigned at the Examiner's earliest convenience.

Respectfully submitted,

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